ABSTRACT

Oral cancer is reported to have one of the highest mortality ratios among all other malignancies. Oral cancer has a multifactorial etiology and is significantly associated with the risk factors of the individual's lifestyle, particularly chronic use of tobacco, spicy food, alcohol and smoking. The ABO blood group is said to influence the development of oral cancer. The surface of red blood cells and various epithelial cells express ABO blood group antigens. Various studies carried out in the Indian population have shown that people with blood group A have a higher predisposition for oral cancer.

Key words: Susceptibility, Oral, Cancer, particularly.

INTRODUCTION

The concept of the presence of an initial premalignant lesion/condition subsequently developing into cancer in the oral mucosa is well established. Oral cancer has a multifactorial etiology and is significantly associated with the risk factors of the individual's lifestyle, particularly chronic use of tobacco, spicy food, alcohol and smoking. In India and South East Asia, chronic use of betel quid (pan) in the mouth has been strongly associated with an increased risk for oral cancer. Genetic factors also have an influence on etiology of cancer. As the ABO blood group is recently proposed to influence the development of oral cancer, various studies are being conducted to evaluate the association between ABO blood group and oral cancer. Studies carried out in India by Tyagi et al, Mittal and Gupta, Nayak, Baruah and Gogoi and Raghavan et al, have shown that people with blood group A have a predisposition for oral cancer.

Incidences of oral cancer

In developing countries, oral cancer is the third most common type of cancer after cervix and stomach. In India, 40% of cancers of the body are oral cancers and is thus considered a killer disease. Oral cancer mortality rate in India is 7.2 per 1,00,000, while the world mortality rate is 2.9 per 1,00,000. Oral cancer has the lowest five year survival rate of less than 50%. Diagnosing them early would reduce the morbidity as well as mortality rates.

The ABO blood groups and cancer

The ABO blood groups were first discovered by Karl Landsteiner in 1900 and a 4th group, AB was later discovered by his pupils Von Decastallo and Sturli in 1902. Etiology of oral cancer is life style changes along with genetic and hereditary influences. The ABO blood groups is one such genetic factor that is said to be associated...
with oral cancer. The precursor antigen for the formation of A and B antigens, is the H antigen and is present in all individuals, irrespective of their blood groups. For those belonging to the A and B blood groups, the precursor H antigen is converted to A and B antigen respectively. People having O blood group have the highest amount of H antigen, which is said to offer protection against oral cancers.\textsuperscript{16}

In A and B blood groups, since the precursor H antigen is converted to A and B antigens, protective effect is not seen in people with these groups. Individuals with blood group A are proposed to be at a higher risk for developing oral cancer due to the expression of an A-like antigen (Forsmann or Tn antigen). The so-called 'incompatible A expression' was detected in cancer. Cancer cells are capable of A antigen expression even in individuals with blood group B or O. Thus antibodies to A can attack precancerous and cancerous cells expressing this antigen. Individuals with blood groups A and AB lack antibodies to A and are thus more likely to develop oral cancer.\textsuperscript{18}

The protective effect of blood group O on cancer development is attributed to the increased apoptosis resistance of epithelial cells presenting A and B antigens.\textsuperscript{19}

The ABO blood group antigens, in addition to being present on the RBC membranes are also found on epithelial cells of various tissues, including the oral mucosa. Tumor development is associated with a downregulation of glycosyl transferase, that is involved in the biosynthesis of A and B antigens.\textsuperscript{17} Partial or complete deletion of epithelial blood group antigens due to aberrations in their synthesis, results in their cell surface changes. This altered antigen pattern on the cell surface is a tumor-associated change that is noted in malignancies.\textsuperscript{20}

The ABO blood group genes are mapped to 9q region where genetic alterations are common in most cancers\textsuperscript{21}

**ABO blood group distribution in India**

The distribution of ABO blood groups vary according to different geographic areas. The most prevalent blood group among Indian population is found to be O group, followed by B, A and AB groups.\textsuperscript{22}

**CONCLUSION**

As studies indicate the susceptibility of A blood group to the development of oral cancer, awareness needs to be spread among the mass. Early and regular cancer screening has to be advised to patients of susceptible blood group if any known and established etiologic factor like tobacco or alcohol abuse is found. Apart from advocating lifestyle modifications, blood donation camps can be utilized as platforms wherein when blood is collected and blood group recorded, donors with susceptible blood group can be counseled and regular cancer screening planned.

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